T. ENGLISH.
Screw-Bolts and Nuts.

No. 135,898. Patented Feb. 18, 1873.

Fig. 1.

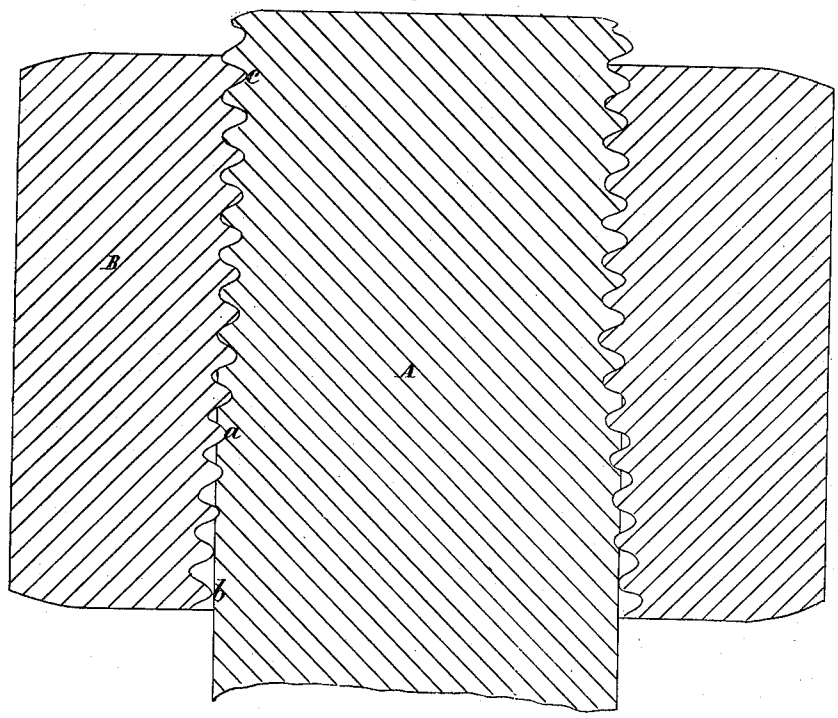
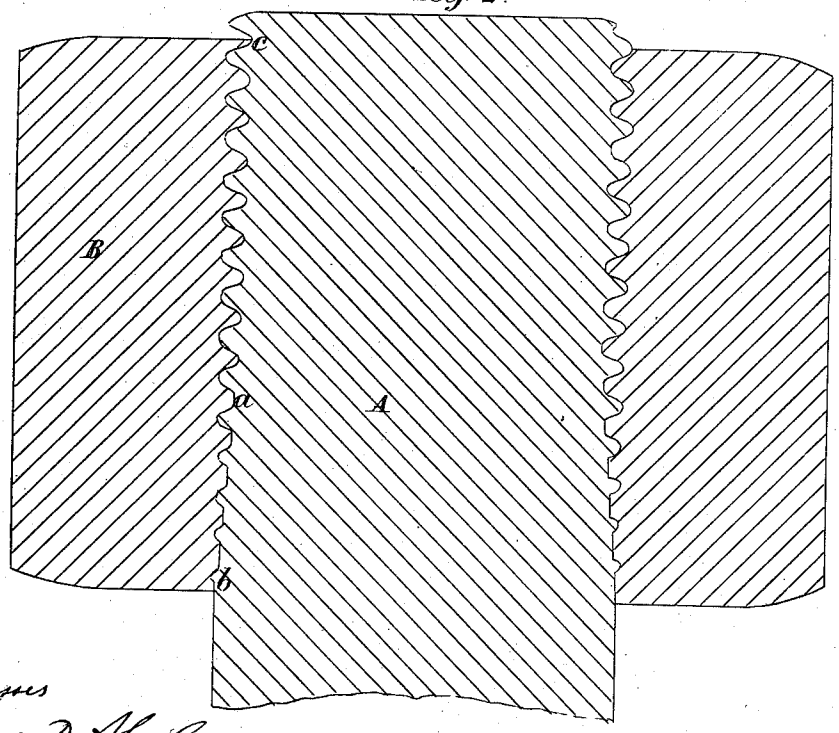


Fig. 2.



Witnesses
Chas. D. Abel
Mo. P. M. Millard

Thomas English
by S. S. Whitman Attorney

UNITED STATES PATENT OFFICE.

THOMAS ENGLISH, OF DULWICH, ENGLAND.

IMPROVEMENT IN SCREW-BOLTS AND NUTS.

Specification forming part of Letters Patent No. **135,898**, dated February 18, 1873.

To all whom it may concern:

Be it known that I, THOMAS ENGLISH, of Dulwich, in the county of Surrey, England, have invented an Improvement in Screw-Bolts and Nuts; and do hereby declare that the following description, taken in connection with the accompanying sheet of drawing, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvement, by which my invention may be distinguished from others of a similar class, together with such parts as I claim and desire to secure by Letters Patent—that is to say:

The object of this invention is to diminish the liability of screw-bolts having cylindrical shanks and sunk threads to break in the screw-threads when subjected to a tensile strain. This is effected in either of two ways.

The first method is shown in Figure 1 of the accompanying drawing, which represents a section of the end of a bolt, A, and a nut, B, constructed for this purpose. The screw-thread of the bolt is made of uniform depth for a certain distance, from *c* to *a*, the rest of the thread, from *a* to *b*, is made of gradually-decreasing depth till it dies out at *b*. The nut is made with a thread of uniform diameter from *c* to *a*, so as to fit that portion of the thread of the bolt. The rest of the nut, from *a* to *b*, is made with a gradually-increasing internal diameter, so that the inner edges of its threads fit the bottoms of the threads of the bolt. The distance from *c* to *a*, throughout which the thread is of uniform depth, is made such that the holding-power of the screw-thread throughout that distance is equivalent to the tensile strength of the bolt at the bottom of its thread; and the distance from *a* to *c* is made such that the holding-power of the screw-thread throughout that distance is equivalent to the tensile strength of the annular area of the thread of the bolt. Thus the total holding-power of the nut on the bolt being made up of the holding-power from *c* to *a* and of that from *a* to *b* is equivalent to the total tensile strength of the shank of the bolt where it is not weakened by the screw-thread. The tapered portions of the threads both of the bolt and of the nut are by preference formed by being chased in a lathe, the chasing-tool being gradually withdrawn from and brought nearer to the center of the lathe, as required.

The second method is shown in Fig. 2. Here the nut is made of uniform internal diameter at the bottom of its thread throughout; but the top of its thread is gradually cut away from a point, *a*, till the internal diameter becomes at *b* equal to the diameter of the shank of the bolt. The thread of the bolt is of uniform depth from *c* to *a*, but the hollow of its thread is filled up gradually more and more from *a* till it is quite filled up at *b*. In this case also the holding-power of the thread from *c* to *a* is made equivalent to the tensile strength of the bolt at the bottom of its thread, while the holding-power of the thread from *a* to *b* is made equivalent to the tensile strength of the annular area of the thread of the bolt, the whole holding-power of the thread being thus equivalent to the tensile strength of the shank or unweakened area of the bolt. The screw-thread of the bolt is, in this case, by preference formed by a die or dies, and that of the nut is made of uniform diameter either by a tap or by a chasing-tool in the lathe, the tops of its threads from *a* to *b* being removed either before or after forming the screw-thread.

The constructions above described are applicable to screw-threads of any pitch or section; but are of greatest advantage when applied to deep threads. The proportions which the uniform parts from *c* to *a* bear to the tapering parts from *a* to *b* may be varied, but the best results are attained when they are proportioned as above described when the nut is screwed onto the bolt as far as it will go. When the nut is not screwed on so far as to engage the taper threads the bolt and nut are equivalent to an ordinary bolt and nut, and may be used for all purposes to which ordinary bolts and nuts are applied.

It may be readily understood that the nut instead of being made in one piece might be made in two parts like a nut and a lock-nut, the one part being suited to the tapered thread of the bolt from *b* to *a* and the other being uniform to fit the part from *a* to *c*.

It may be also understood that the tapering of the thread of the bolt may be effected by a combination of the two methods shown in Figs. 1 and 2—that is to say, partly by the dying out

of the bolt-thread, as shown in Fig. 1, and partly by filling up the hollow of the bolt-thread, as shown in Fig. 2.

It will be seen that in neither case according to my construction does the diameter of the bolt measured over the tops of its threads vary, while the depth of the thread remains uniform, as in the case of an ordinary tapered bolt, which I do not desire to claim.

What I do claim is—

The use of bolts and nuts wherein the diameter of the bolt measured at the bottom of its thread increases toward the shank, substantially for the purpose, and in the manner above described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses this twenty-ninth day of May, 1872.

THOMAS ENGLISH.

Witnesses:
CHAS. D. ABEL,
JNO. P. M. MILLARD.